THE RESCUE OF APOLLO 11

CORONA AND DMSP'S UNFORESEEN MISSION

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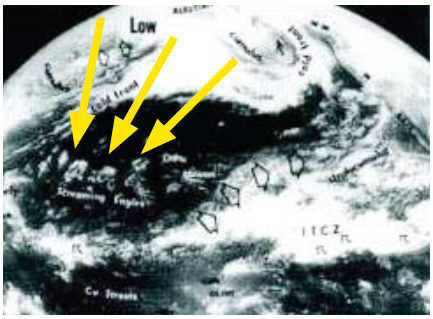
CAPTAIN HANK BRANDLI KNEW A TERRIBLE SECRET IN THE SUMMER OF 1969: the U.S. Air Force meteorologist had classified information indicating danger to the Apollo 11 crew returning to Earth from their historic mission. They had done it—the Eagle had landed. Neil Armstrong and Buzz Aldrin had walked on the moon, raised the American flag, collected samples, and then blasted off for a perfectly executed lunar orbit rendezvous with Michael Collins in the command module *Columbia*. Now they were headed home on the final leg of the trip for a July 16 splashdown in the Pacific Ocean. However, from his highly classified weather forecasting work, Capt Brandli realized that instead of a heroes' welcome, the astronauts could face a watery grave.

Liftoff of the Apollo 11 lunar landing mission on July 16, 1969, from the Kennedy Space Center, Florida.
Photo Credit: NASA Johnson Space Center.

Brandli worked at Hickam Air Force Base, Hawaii, as a weather tracking and prediction specialist, with a National Reconnaissance Office (NRO) satellite known as 417, a program later redesignated as the Defense Meteorological Satellite Program (DMSP)[1]. This weather satellite supported the top secret CORONA reconnaissance satellite program—one of the Cold War's most closely guarded secrets. The CORONA satellites photographed "denied areas," such as the Soviet Union, China, and other areas of interest, from Earth orbit. Program planners knew from RAND Corporation studies and early mission results that imaging success depended on accurate and timely meteorological forecasts. Indeed, initial CORONA missions flown during 1960–61 delivered some very expensive photographs of clouds.

CORONA's weather eye-in-the-sky had its beginnings in

[1] Before its designation as DMSP, the weather satellite program had a succession of numeric and alphabetic names, including Program II, P-35, 698BH, 417, and Defense Systems Applications Program. In order to avoid confusion, this article uses the current designation DMSP throughout. For a complete history, see R. Cargill Hall, *A History of the Military Polar Orbiting Satellite Program*, (Chantilly, VA: NRO History Office, September 2001).



Yellow Arrows: "Screaming Eagles" thunderstorm cloud formations.

A JC-130 recovery aircraft of the U.S. Air Force 6594th Test Group retrieves a CORONA satellite film return capsule, also known as a "bucket," over the Pacific Ocean.

1961, when Under Secretary of the Air Force Joseph V. Charyk, who was dual-hatted as the first director of the NRO (DNRO), arranged the organization, construction, and funding for a weather satellite program that would become known as DMSP. Before long, designers, technicians, and engineers developed a series of very successful defense meteorological "birds" and ground stations, like the one at Tan Son Nhut Air Base, South Vietnam, where Brandli first worked with the DMSP Block 4 satellite in 1966.

Brandli was not cleared for CORONA while he served in Vietnam, so he was told a cover story. "I was always under the impression that we launched those weather satellites and systems for the war… People would ask, 'why is it so classified?' They said [it was] because we signed an agreement with the Russians that we would share meteorological information," he explained.

It was not until after the weather expert left Vietnam to assume new duties in support of the CORONA program that he learned of DMSP's primary mission: "When I went to Hawaii in '67, it all came together," Brandli recalled. "I say, Holy Smokes, that's what this weather satellite is for—to support CORONA! We wanted the best weather information so we could turn the cameras on over the Soviet Union and China."

At Hickam, Brandli's weather reports and forecasts ensured that film return capsules deorbited from CORONA satellites returned to clear skies over the Pacific Ocean. The film return capsules, known as "buckets," descended by parachute and were captured in mid-air by specially outfitted cargo aircraft. Few people were aware of what the Air Force meteorologist really did. "It was so top secret that I wasn't allowed to show anybody… In the 6594th Test Group that ran the C-130s that caught the film canister, there was only one guy who knew… The Vice Commander wasn't even briefed. It was wicked hush-hush," Brandli recalled. (See photo above.)

During the Apollo missions of the late 1960s, Brandli discovered that he could use high resolution DMSP satellite data to forecast weather anywhere within the area stretching from the equator up to 25-degrees

Top: *Recovery team secures the Apollo 11 command capsule. Photo credit: NASA History Office.*

Above: *President Richard M. Nixon shares a light moment with returning Apollo 11 Astronauts Neil Armstrong, Michael Collins, and Buzz Aldrin on the aircraft carrier USS Hornet, following the safe recovery of their capsule from the Pacific Ocean. Photo credit: NASA History Office.*

of latitude, five days in advance, which was unheard of in those days. "We noticed violent thunderstorm weather patterns: high-level vortexes that were bird-like, almost an eagle shape. We dubbed them Screaming Eagles," he remembered. (See photo on previous page.) In mid-July 1969, in the course of his forecasting duties, Brandli saw clearly that the Apollo 11 astronauts were scheduled to splash down directly into the path of violent thunderstorms characterized by these destructive high-altitude winds.

It was a crazy situation," Brandli said in a December 13, 2004, *Aviation Week and Space Technology* article. "With just 72-hours to go, I had all these classified photos of a deadly 'Screaming Eagle' thunderstorm, with tops at 50,000 feet, forming over exactly where I knew the Apollo 11 astronauts were going to come down. The [storm] would have ripped their parachutes to shreds. Without parachutes, they'd have crashed into the ocean with a force that would have killed them instantly. I was the only person who knew this and, because the [DMSP] program and its technology were strictly classified, I couldn't warn NASA."

Brandli took action to bring his secret knowledge to the attention of the right people, putting into motion risky actions to try to save the astronauts' lives. He found out that the U.S. Navy was in charge of forecasting weather for the Apollo 11 mission. Brandli contacted the Department of Defense (DoD) chief weather officer, Navy Captain Willard (Sam) Houston, Jr., at the Fleet Weather Center in Pearl Harbor, knowing that he had to convince CAPT Houston of the danger.

"Thank God it was him, because Houston was briefed on 417 (DMSP)," said Brandli, adding that, "Ironically, he was the guy that briefed President Johnson on a cloud seeding program that I worked on in Vietnam. We had a lot in common, even though I had never met him." Brandli told Houston, "There's going to be a real problem. I want you to meet me in the parking lot of the 6594th Test Group hangar at Hickam Air Force Base."

Houston had just arrived in Hawaii, and was not briefed on CORONA, but he did have DMSP clearances, so Brandli took him to his secure office in the 6594th's Headquarters Building. According to the *Aviation Week* story, Houston recalled, "When I got to the vault, Captain Hank Brandli literally yanked me though the door. The DMSP classified images showed all the signs of a major tropical storm forming over the splashdown site, but due to security and the chain-of-command, [Brandli] was locked in and couldn't tell anyone. I'd arrived just in time."

Having shown the DMSP imagery to Houston, Brandli convinced him he had proof that the landing site needed to be changed. Although he had irrefutable proof, "CAPT Houston had to convince [Rear] Admiral [Donald C.] Davis without the photos, which were from a satellite that wasn't supposed to exist," stressed Brandli. Houston did manage to convince Davis, who responded that now he (Houston) would have to convince Washington, saying, "I don't think they'll have any choice… You'd better be right, young man!"

Davis had to reroute the entire *USS Hornet* carrier task force, which was to support the returning Apollo 11 crew, to the new splashdown area before he received official orders to do so.

If Houston was mistaken about the storm, or if the orders did not come, "it was a career-ender for both of us, and we knew it," Houston said. "With Rear Admiral Davis moving already, redirecting the carrier task force to a new location, I called the satellite program office to ensure that NASA's chief meteorologist declared a national emergency," Houston added. After all, President Richard M. Nixon was scheduled to greet the returning heroes on the *Hornet*. With some difficulty, NASA and the U.S. Navy made last-minute changes to Apollo 11's reentry and splashdown profile, saving the astronauts and their mission.

Thirty years later, in 1995, when President Clinton declassified the CORONA project, Houston and Brandli could at last reveal their secret. Houston was finally able to talk about the Navy Commendation medal he received from then Chief of Naval Operations Admiral Elmo R. Zumwalt, Jr., for saving Apollo 11. Reminiscing about what could have gone wrong, Brandli observed, "It was a huge undertaking to move the carrier recovery fleet and convince the 'powers that be' to change the landing site. CAPT Houston did a hell of a job. I often wonder: if it had been anyone else, would it have happened the same way?"

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"When you look back," Houston agreed, "so many things had to happen to make it come out right." Brandli noted that after the declassification effort, Houston told him, "They sent reconnaissance aircraft out to check [the weather], and we were right on the money," said Brandli, adding, "and I never knew that for thirty years."

The CORONA satellite reconnaissance program exceeded all expectations by giving much to the science of astronautics and in the areas of strategic reconnaissance, arms control, treaty verification, as well as the study of the environment, and global change.

CORONA, through its weather support system partner, DMSP, performed in ways never imagined by its supporters. Indeed, in December 1969, soon after the Apollo 11 mission, two high-level NRO visitors came to Hawaii to learn first hand of the weather satellite's contributions, said Brandli, who believes that if there had not been a CORONA program, there would not have been a DSMP.

"[Dr.] John McLucas and Dr. Robert Naka visited us in Hawaii to see what we were doing," Brandli said, unaware at the time that both men supervised the National Reconnaissance Program, as DNRO and DDNRO, respectively, in addition to performing their public Air Force-titled duties. "I showed them the Screaming Eagle [thunderstorm] images… They were very impressed by our work, particularly Dr. Naka, who was an optics expert and fascinated by DMSP imagery, including the ringed halos we spotted over the Mt. Kilauea volcano, which he identified as high-altitude light refractions." It is no wonder that McLucas and Naka were impressed with the CORONA and DMSP programs and all the people who made them a reality.

Noel A. McCormack, a senior NRO research historian, based this article on a June 14, 2005 discussion he had with Hank Brandli, and a December 13, 2004, Aviation Week and Space Technology article entitled "Saving Apollo 11." Quotations and paragraphs describing the role of CAPT Sam Houston, Jr., also were taken from the above referenced article.